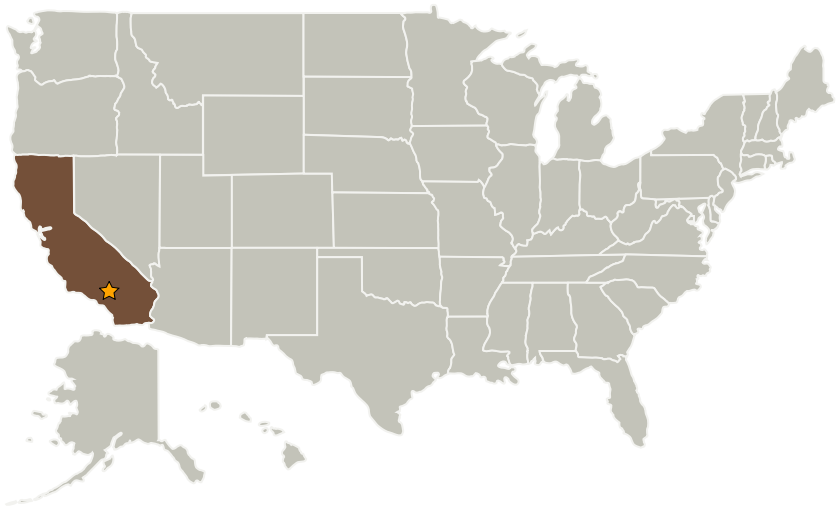
Adaptive Filtering for Aeroservoelastic Response Suppression, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

CSA Engineering proposes the design of an adaptive aeroelastic mode suppression for advanced fly-by-wire aircraft, which will partition the modal suppression function from the rigid-body Flight Control System (FCS). CSA is recognized as having world-class expertise in the areas structural dynamics, vibration control, and control-structure interaction. Phase 1 will leverage expertise in structural dynamics and system-identification to develop adaptive filtering algorithms which operate in both the spatial and time domains to identify/estimate key aeroelastic generalized (modal) DOF and suppress aeroservoelastic interactions while minimizing the degradation of phase margin with respect to the FCS. During Phase 1, CSA will develop an end-to-end aeroelastic aircraft dynamic model of appropriate complexity as well as related sensors and measurement systems which will support the adaptive mode suppression effort. Sensors and measurement systems will be evaluated concurrently with adaptive filtering algorithms with regard to convergence, stability, and robustness. Filter architecture parameterization and constraints will be investigated. The goal of this development is to partition the suppression of aeroservoelastic interactions separate from the rigid body FCS, enabling FCS design and configuration/adaptation to be independent of aeroservoelastic considerations.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
CSA Engineering, Inc.	Supporting Organization	Industry	Mountain View, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Paul Keas

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity